FIG.1

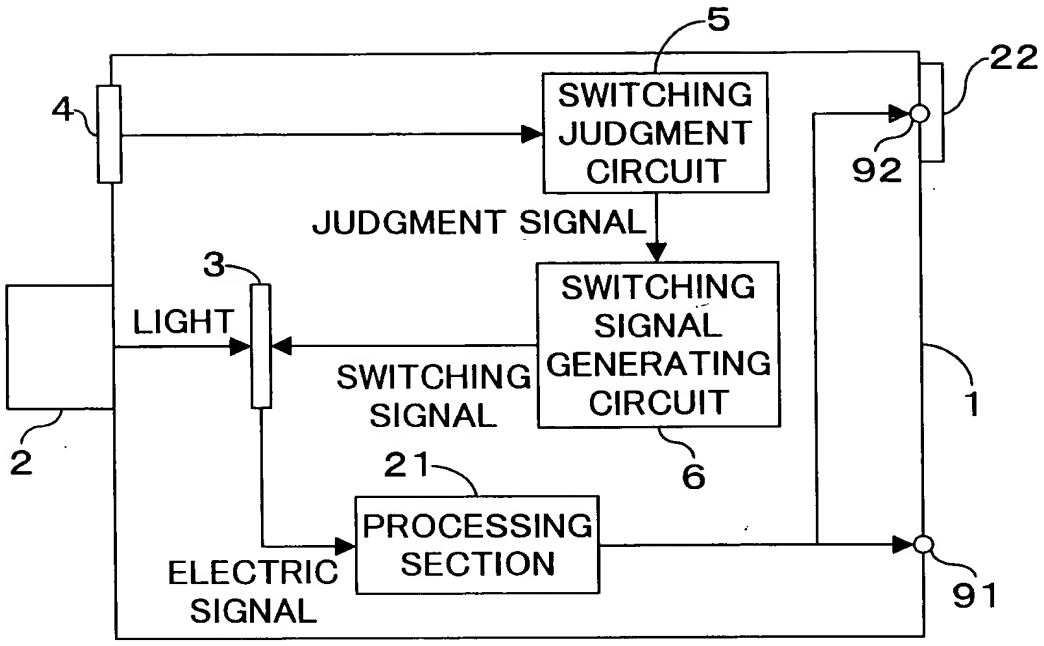

5
SWITCHING JUDGMENT CIRCUIT
4
22
92
JUDGMENT SIGNAL
3
SWITCHING SIGNAL GENERATING CIRCUIT
LIGHT
SWITCHING SIGNAL
1
2
6
21
PROCESSING SECTION
ELECTRIC SIGNAL
91

FIG.2

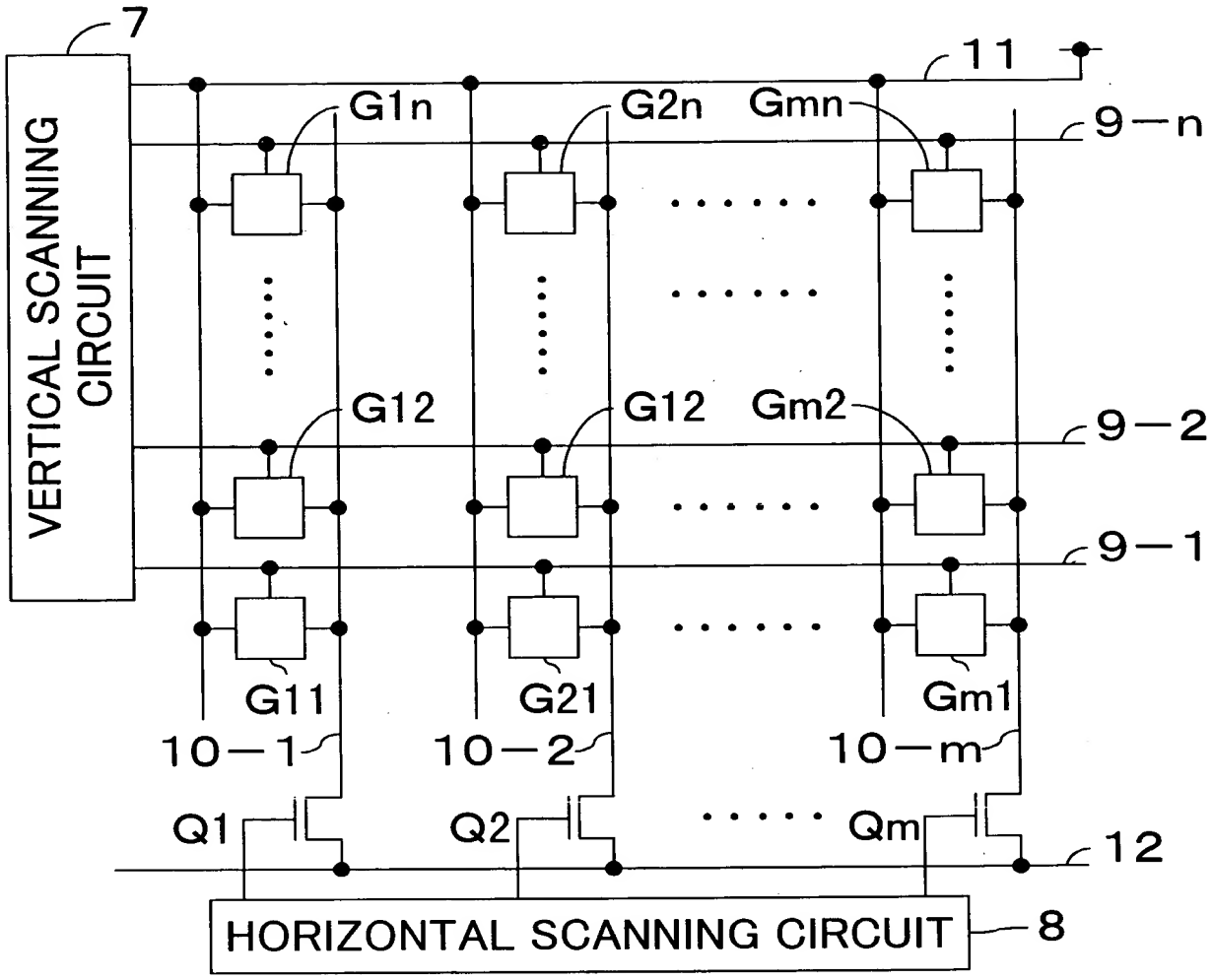

7
VERTICAL SCANNING CIRCUIT
11
G1n
G2n
Gmn
9—n
G12
G12
Gm2
9—2
9—1
G11
G21
Gm1
10—1
10—2
10—m
Q1
Q2
Qm
12
HORIZONTAL SCANNING CIRCUIT
8

FIG.3

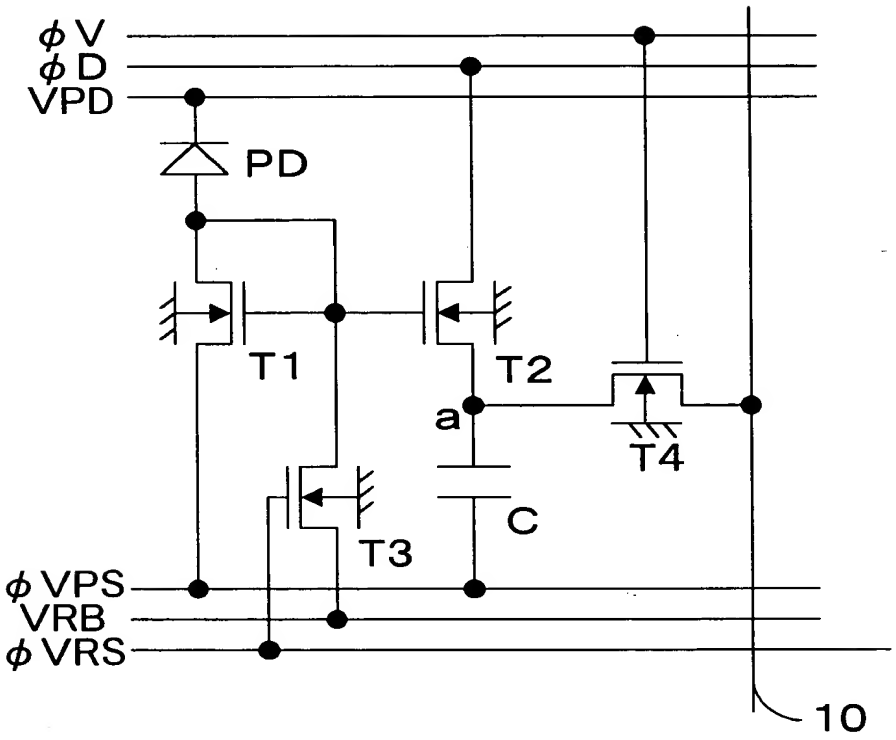


FIG.4

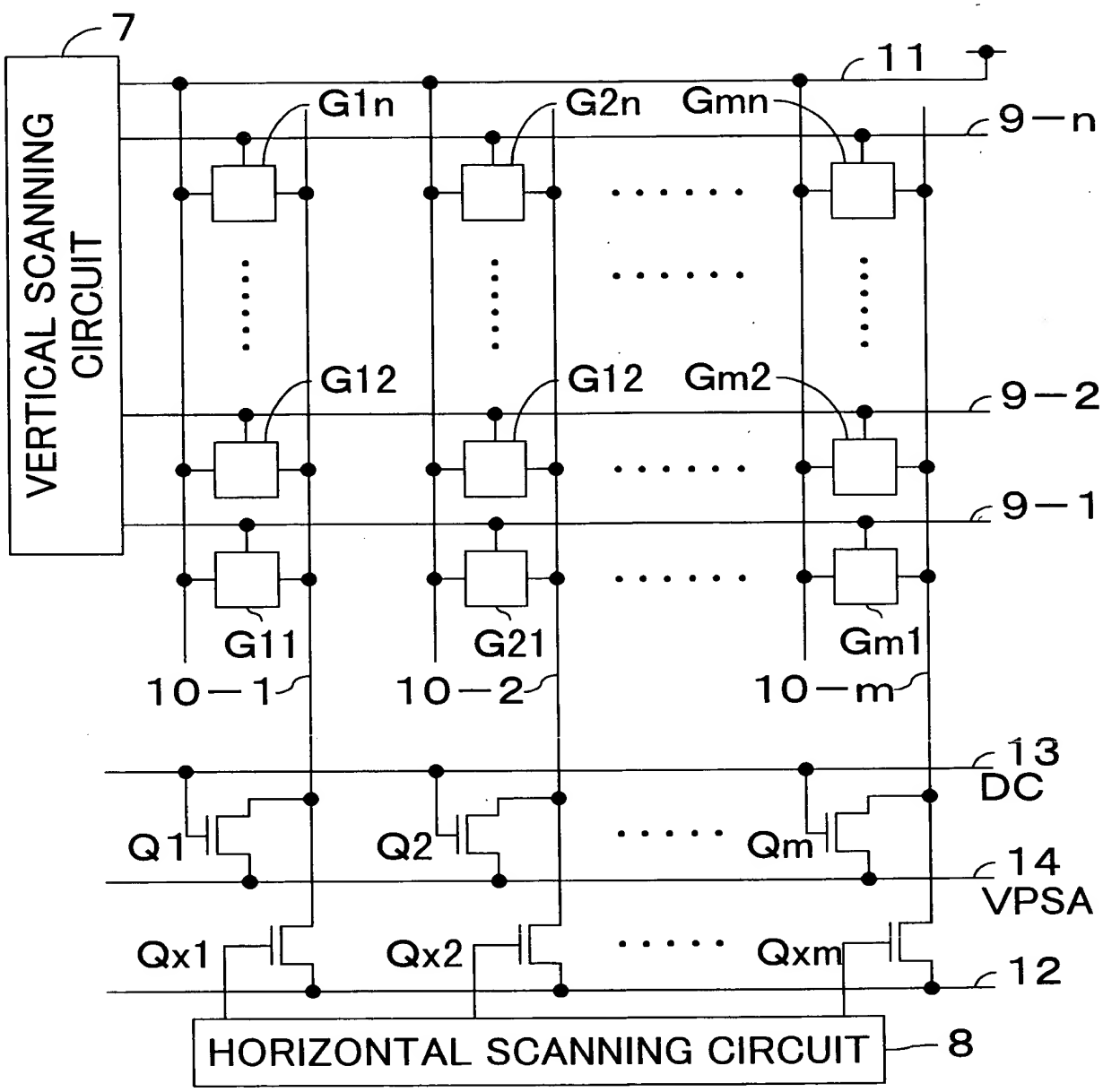

7
VERTICAL SCANNING CIRCUIT
11
G1n
G2n
Gmn
9−n
G12
G12
Gm2
9−2
9−1
G11
G21
Gm1
10−1
10−2
10−m
13
DC
Q1
Q2
Qm
14
VPSA
Qx1
Qx2
Qxm
12
HORIZONTAL SCANNING CIRCUIT
8

FIG.5A

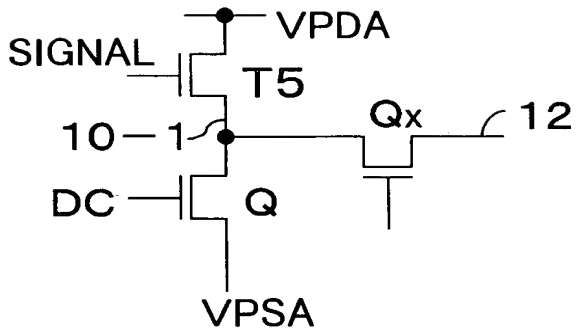


FIG.5B

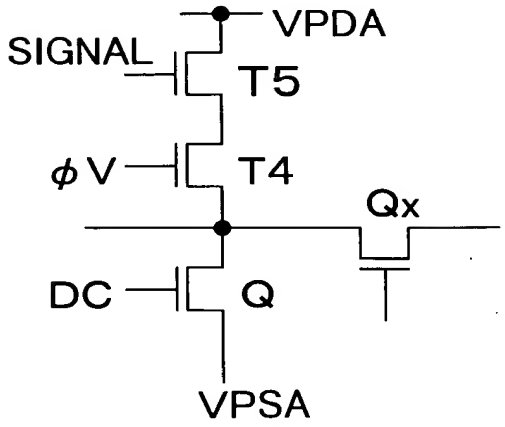


FIG.6

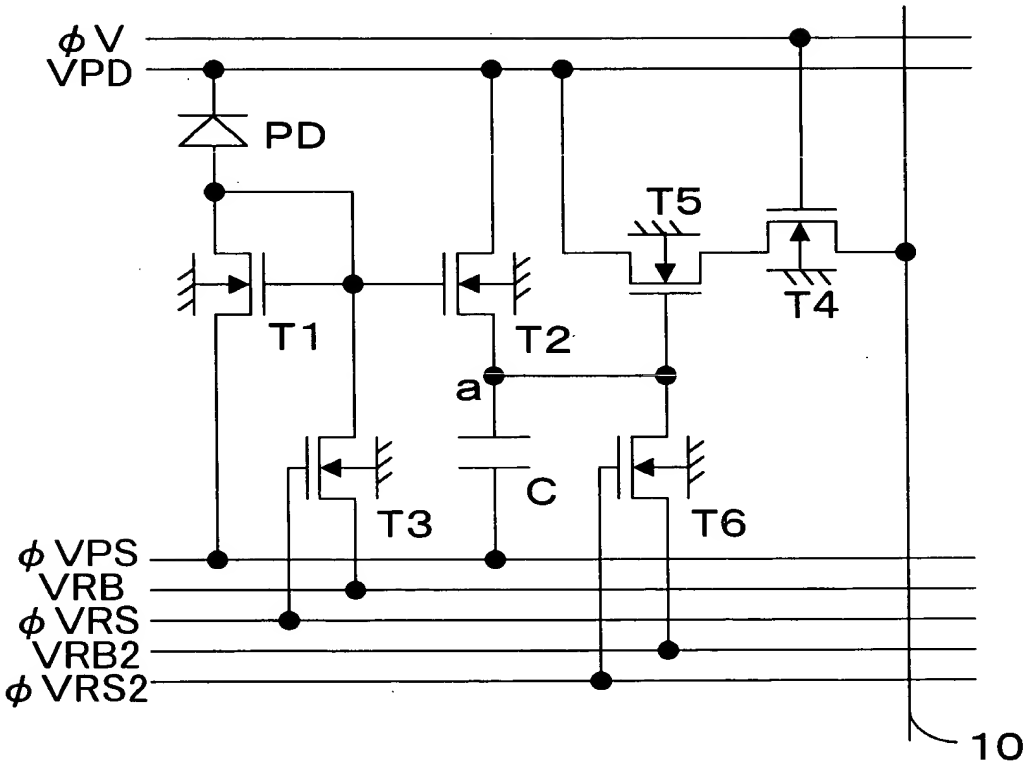


FIG.7A

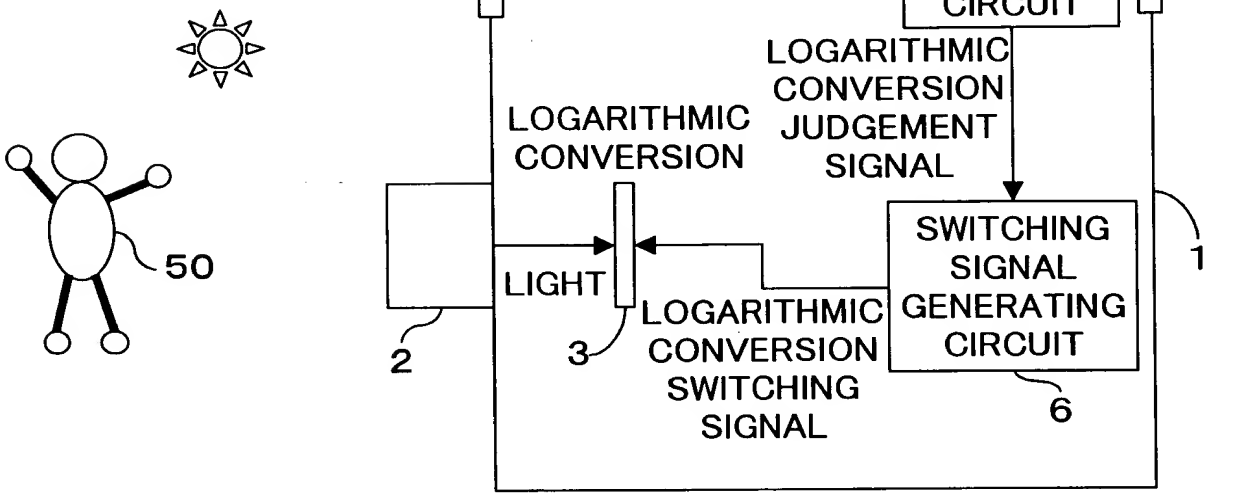

5
22
4
SWITCHING JUDGMENT CIRCUIT
LOGARITHMIC CONVERSION JUDGEMENT SIGNAL
LOGARITHMIC CONVERSION
SWITCHING SIGNAL GENERATING CIRCUIT
1
LIGHT
LOGARITHMIC CONVERSION SWITCHING SIGNAL
2
3
6
50

FIG.7B

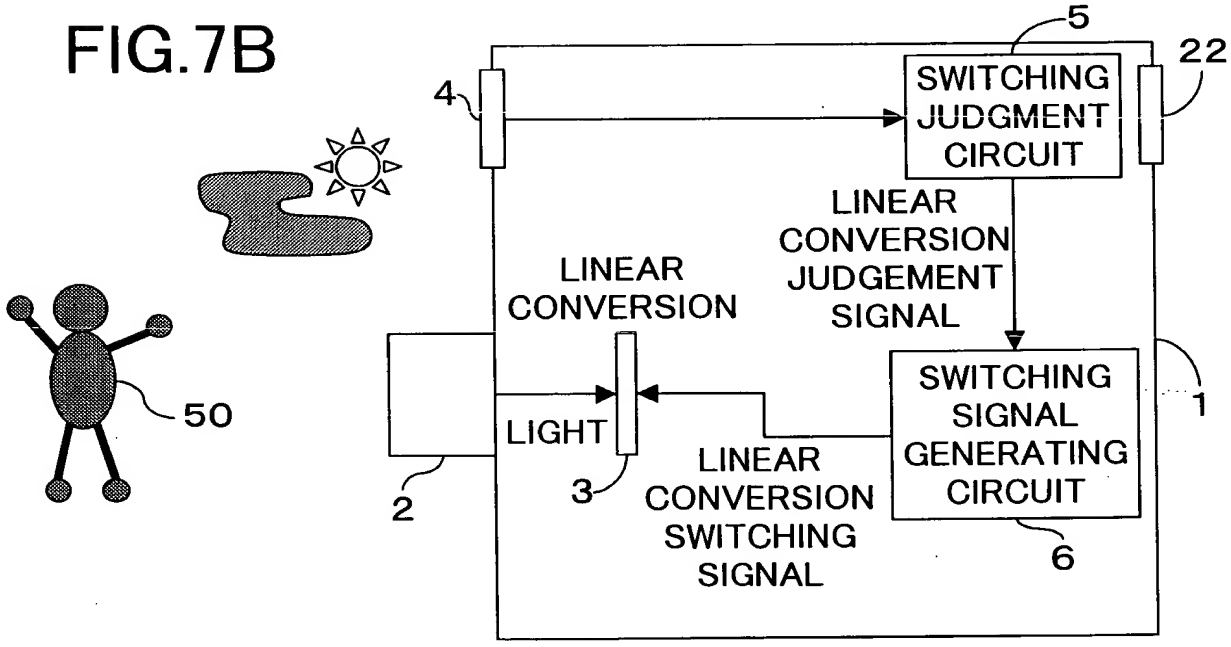

5
22
4
SWITCHING JUDGMENT CIRCUIT
LINEAR CONVERSION JUDGEMENT SIGNAL
LINEAR CONVERSION
SWITCHING SIGNAL GENERATING CIRCUIT
1
LIGHT
LINEAR CONVERSION SWITCHING SIGNAL
2
3
6
50

FIG.8

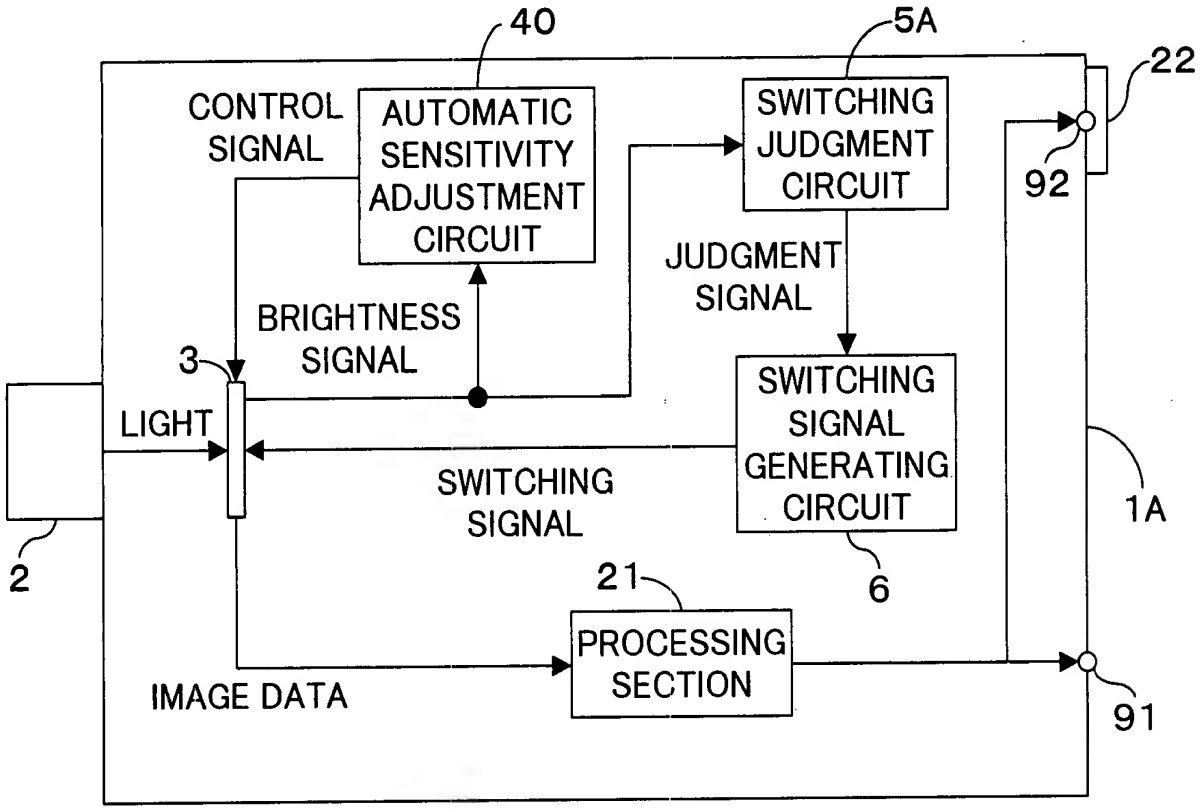

40
5A
22
CONTROL SIGNAL
AUTOMATIC SENSITIVITY ADJUSTMENT CIRCUIT
SWITCHING JUDGMENT CIRCUIT
92
JUDGMENT SIGNAL
BRIGHTNESS SIGNAL
3
LIGHT
SWITCHING SIGNAL GENERATING CIRCUIT
SWITCHING SIGNAL
1A
2
6
21
PROCESSING SECTION
IMAGE DATA
91

FIG.9

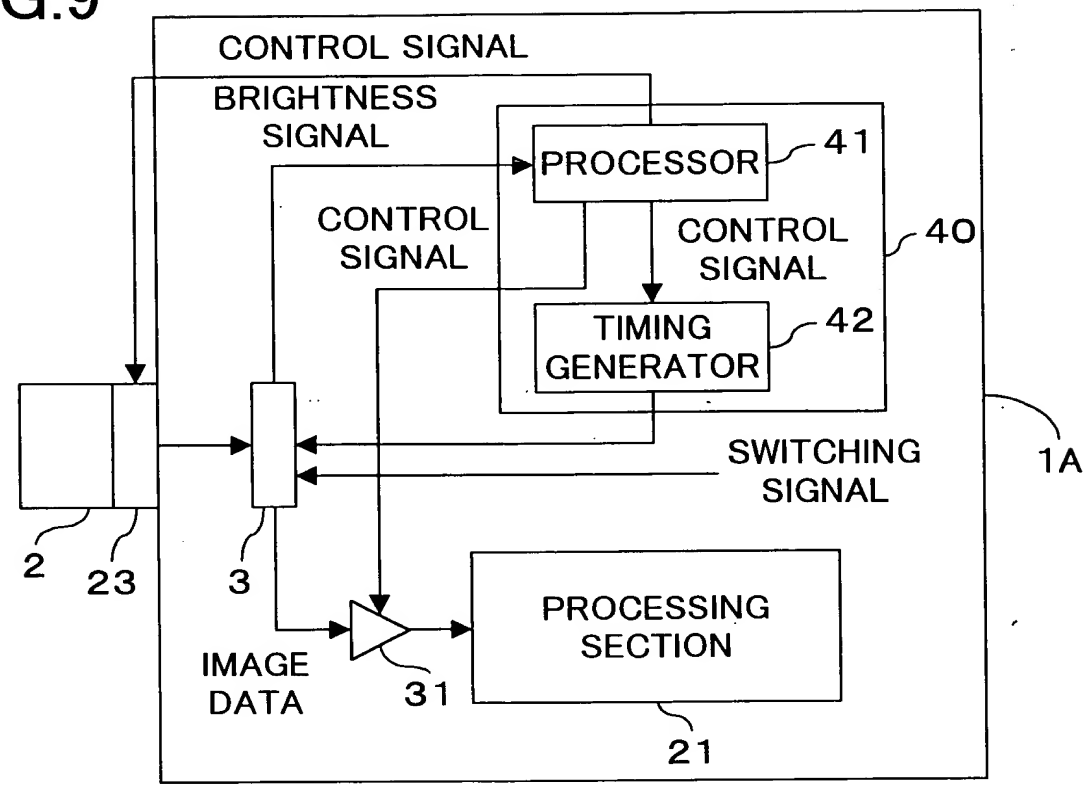
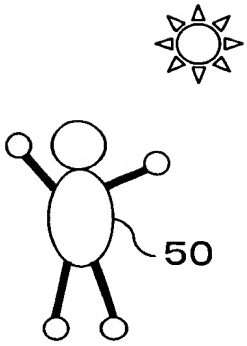

CONTROL SIGNAL
BRIGHTNESS SIGNAL
PROCESSOR
41
CONTROL SIGNAL
CONTROL SIGNAL
40
TIMING GENERATOR
42
SWITCHING SIGNAL
1A
2
23
3
IMAGE DATA
31
PROCESSING SECTION
21

FIG.10A



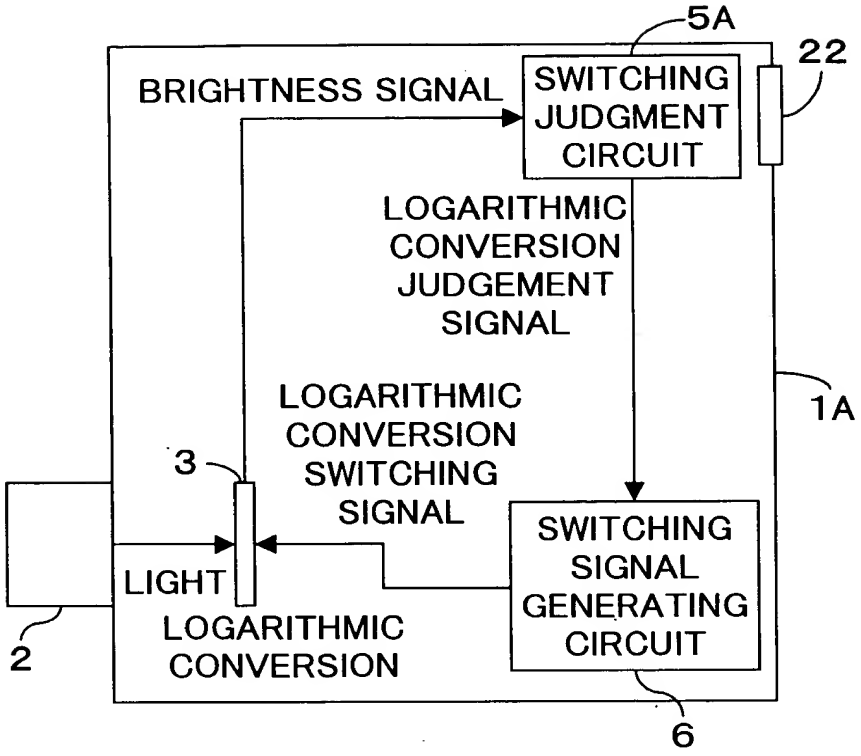
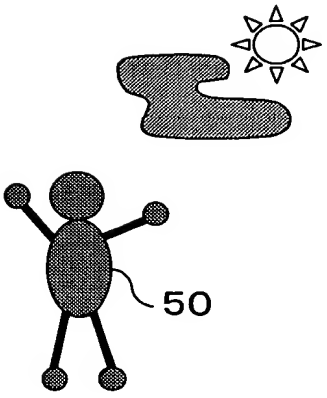


FIG.10B



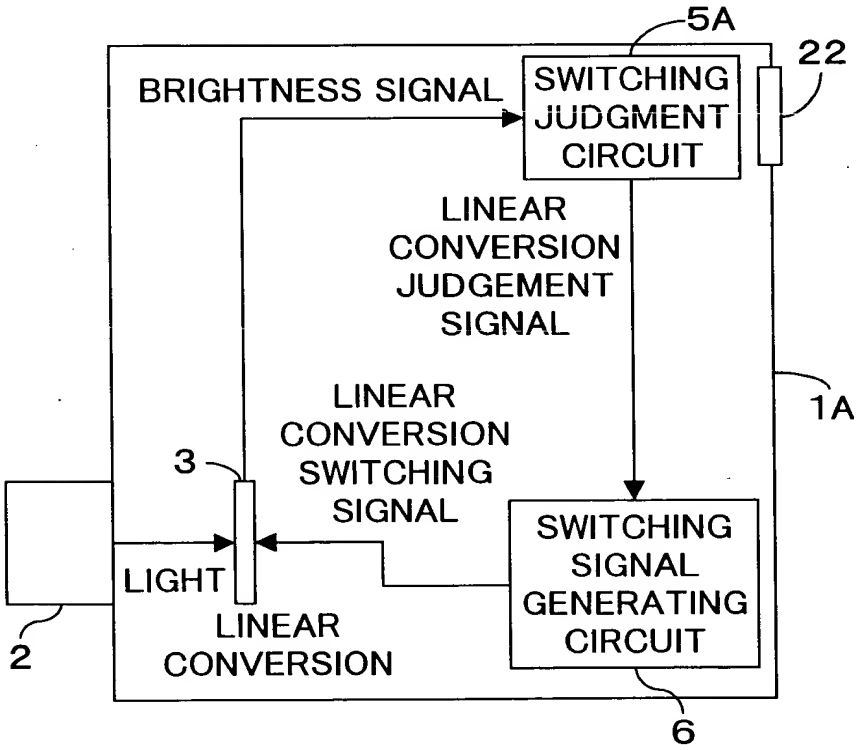


FIG.11

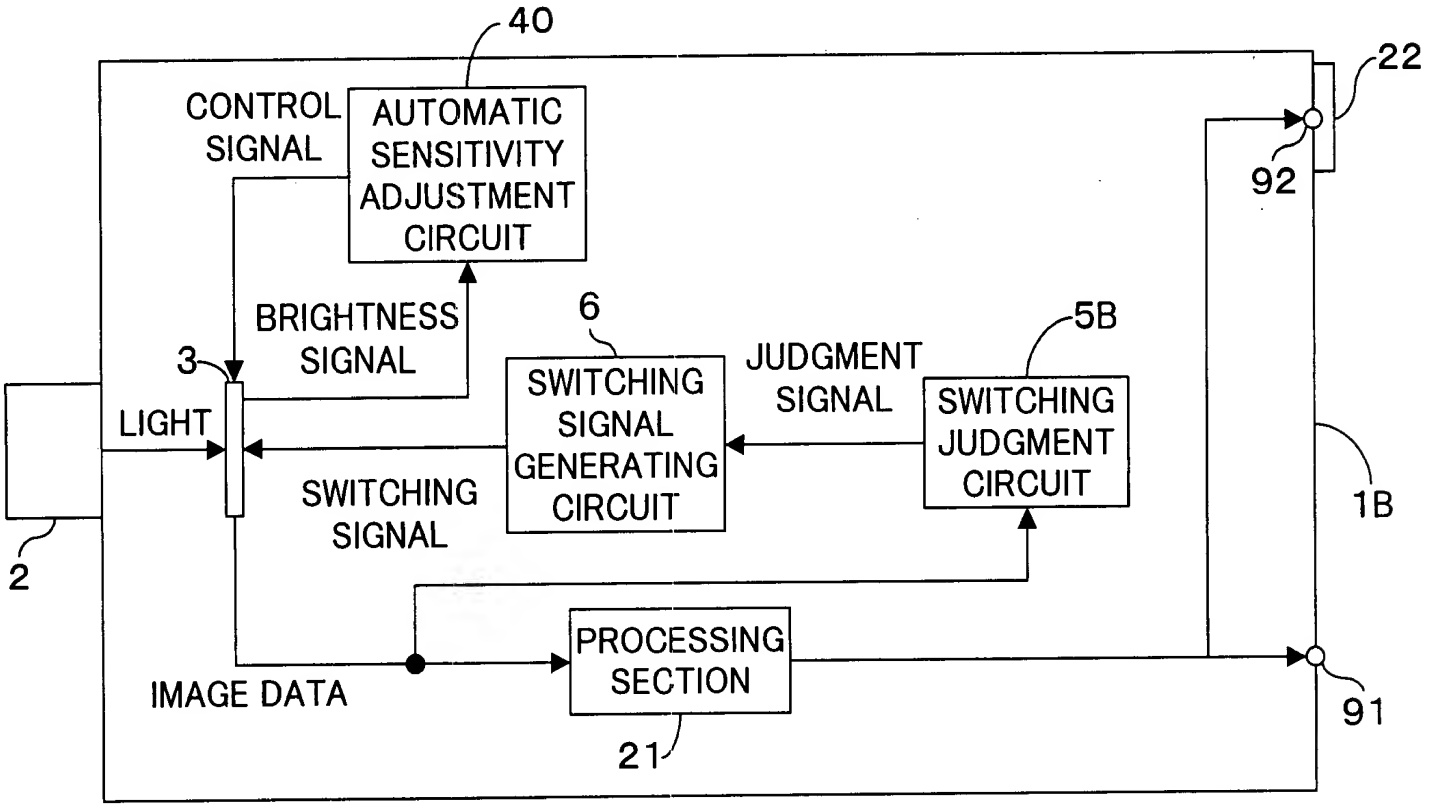

40
CONTROL SIGNAL
AUTOMATIC SENSITIVITY ADJUSTMENT CIRCUIT
22
92
BRIGHTNESS SIGNAL
6
5B
3
JUDGMENT SIGNAL
SWITCHING SIGNAL GENERATING CIRCUIT
SWITCHING JUDGMENT CIRCUIT
LIGHT
1B
SWITCHING SIGNAL
2
PROCESSING SECTION
IMAGE DATA
91
21

FIG.12A

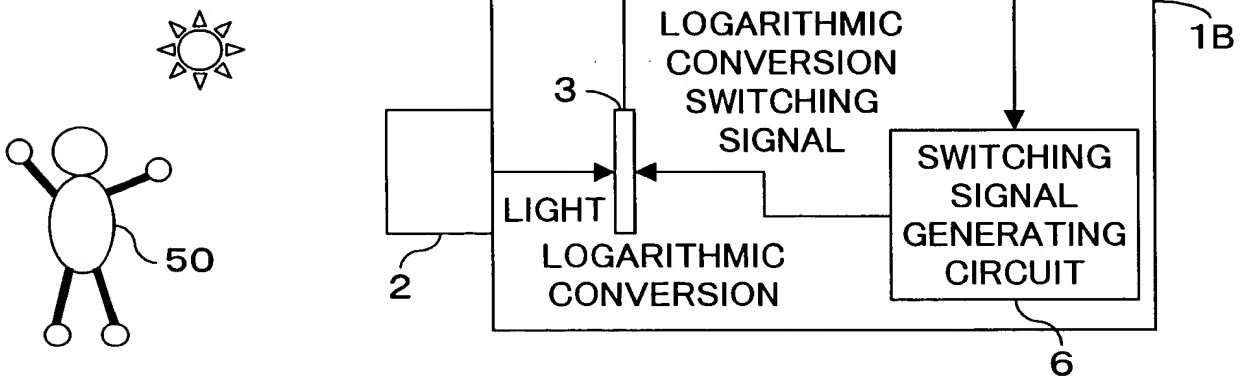


FIG.12B

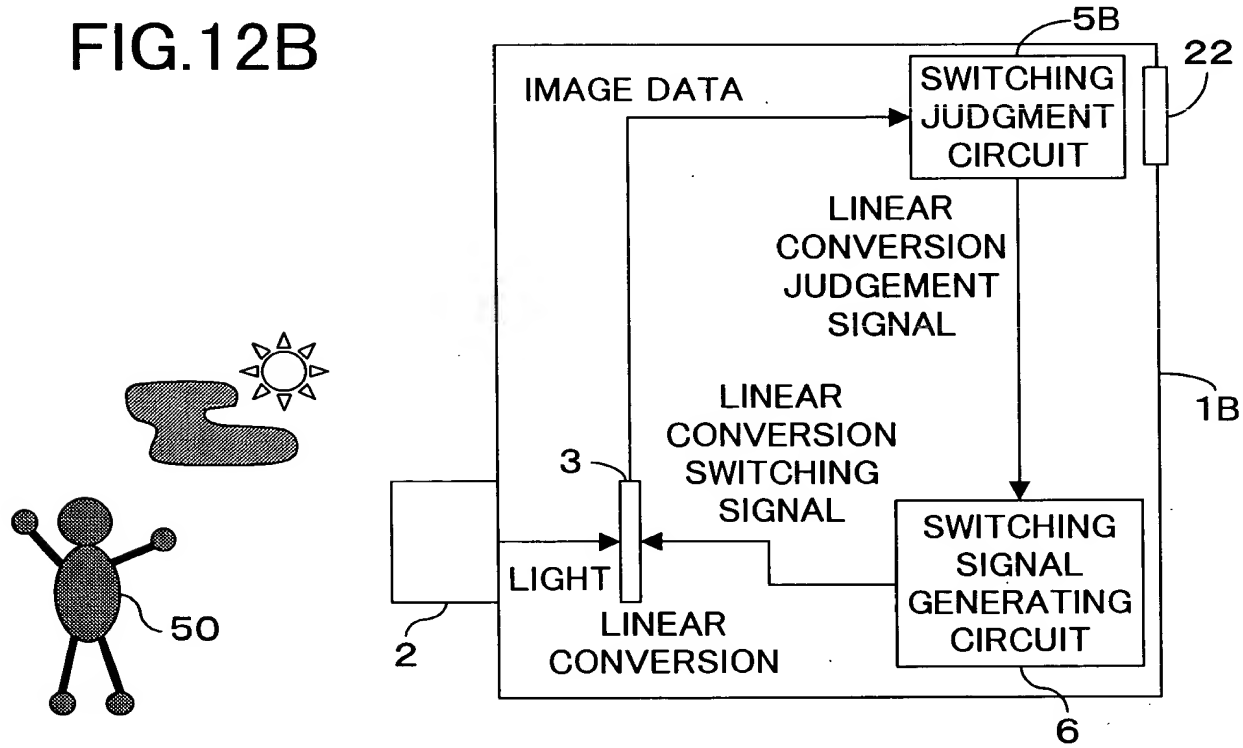


FIG.13

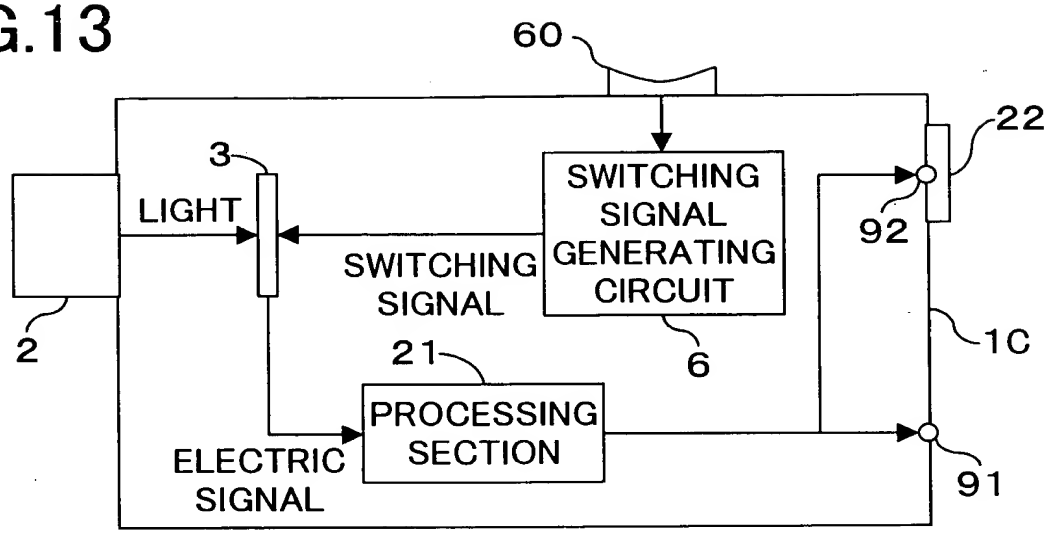

60
22
3
LIGHT
SWITCHING SIGNAL GENERATING CIRCUIT
92
SWITCHING SIGNAL
2
6
1C
21
PROCESSING SECTION
ELECTRIC SIGNAL
91

FIG.14

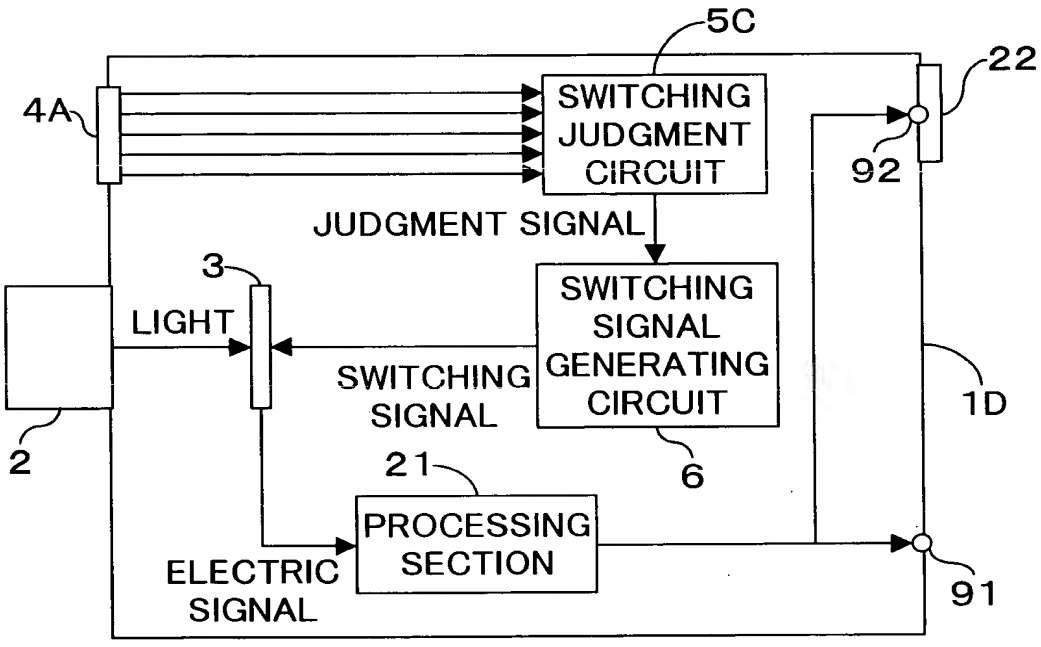

5C
22
4A
SWITCHING JUDGMENT CIRCUIT
92
JUDGMENT SIGNAL
3
SWITCHING SIGNAL GENERATING CIRCUIT
LIGHT
SWITCHING SIGNAL
1D
2
6
21
PROCESSING SECTION
ELECTRIC SIGNAL
91

FIG.15A

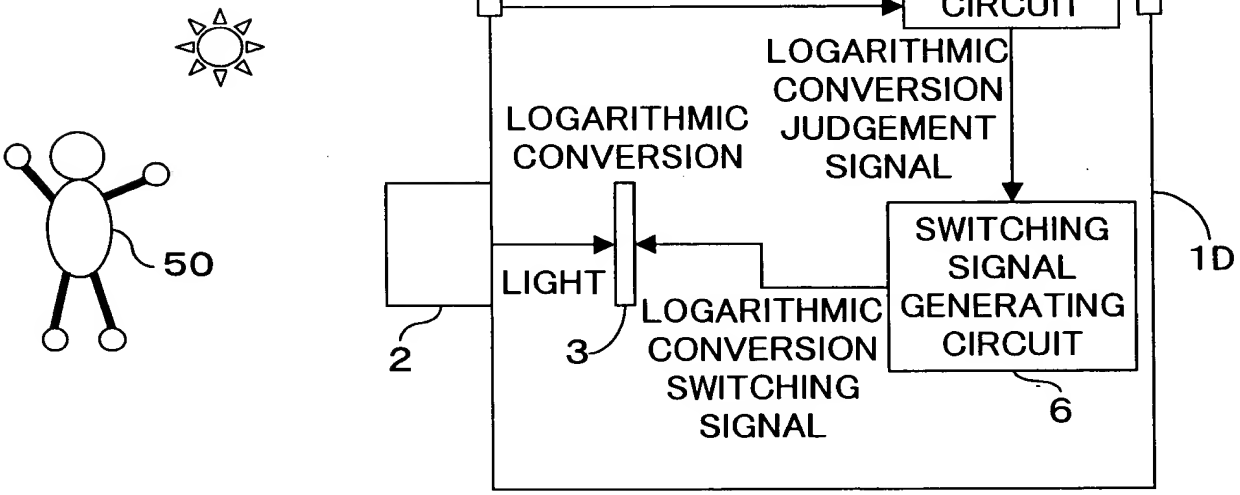


FIG.15B

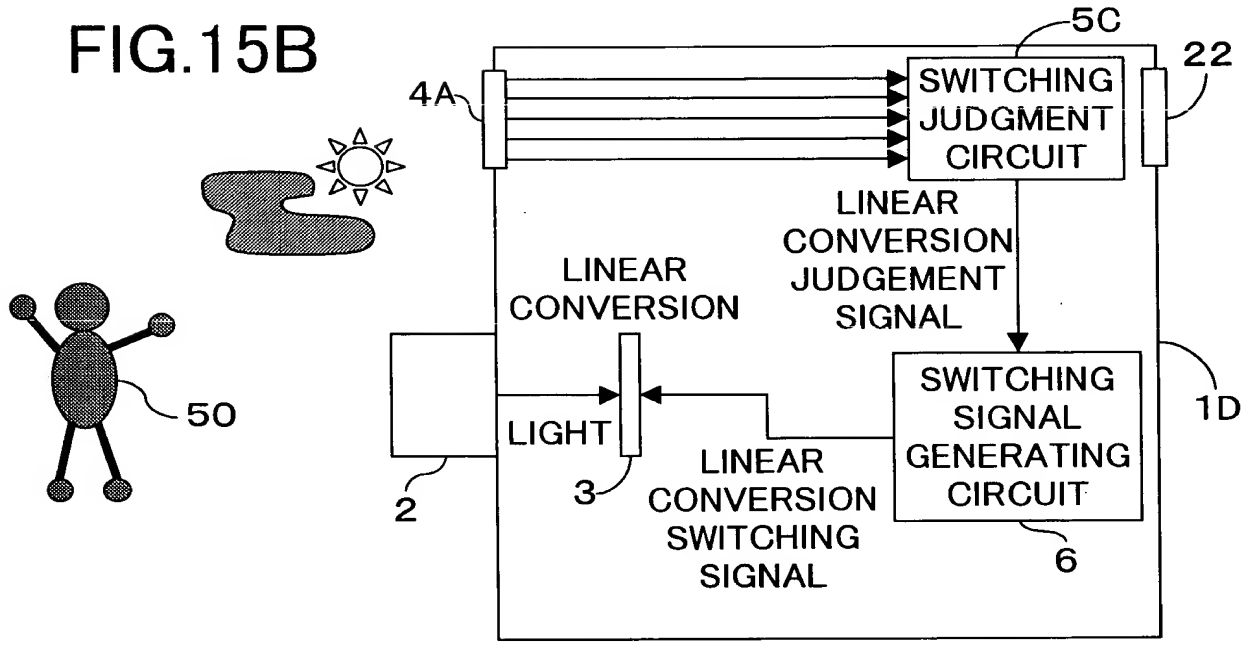


FIG.16

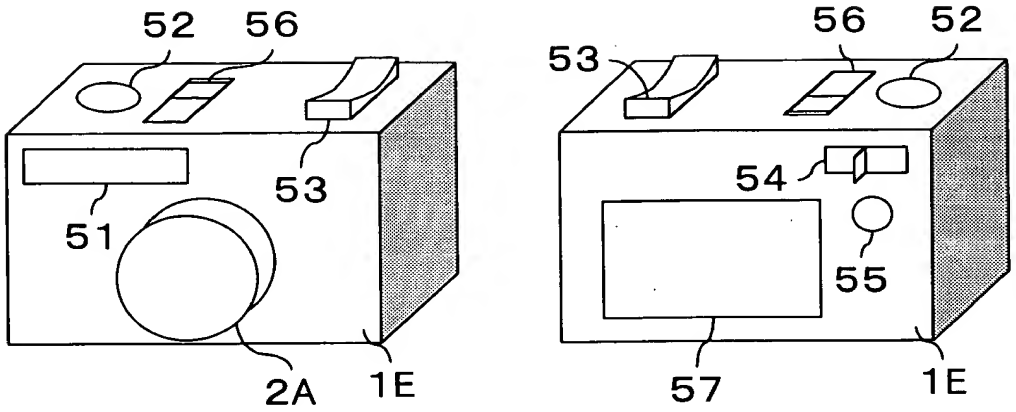


FIG.17

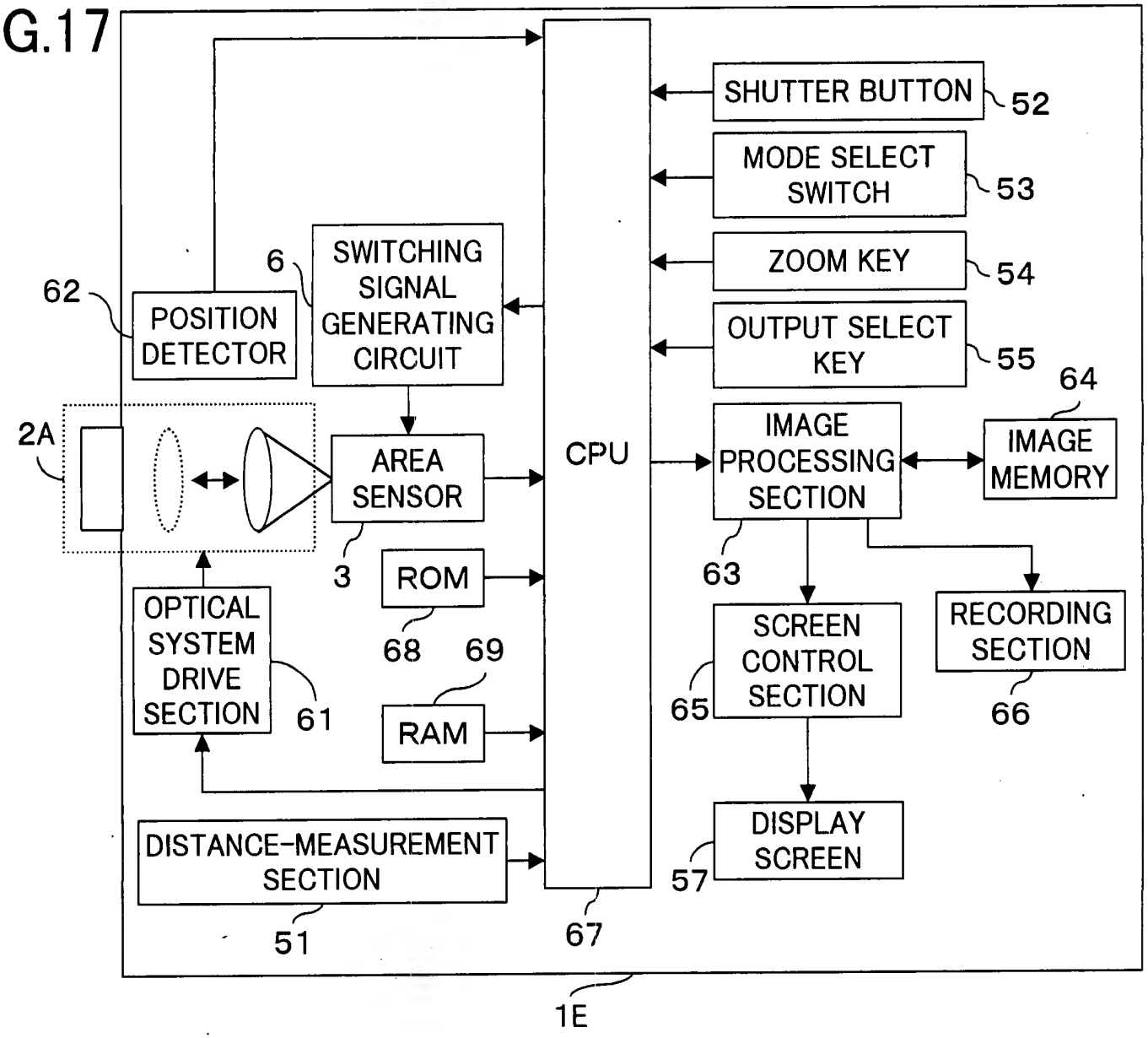

SHUTTER BUTTON
52
MODE SELECT SWITCH
53
ZOOM KEY
54
OUTPUT SELECT KEY
55
64
IMAGE MEMORY
IMAGE PROCESSING SECTION
63
CPU
6
SWITCHING SIGNAL GENERATING CIRCUIT
62
POSITION DETECTOR
2A
AREA SENSOR
3
ROM
68
69
RAM
OPTICAL SYSTEM DRIVE SECTION
61
SCREEN CONTROL SECTION
65
RECORDING SECTION
66
DISPLAY SCREEN
57
DISTANCE-MEASUREMENT SECTION
51
67
1E

FIG.18

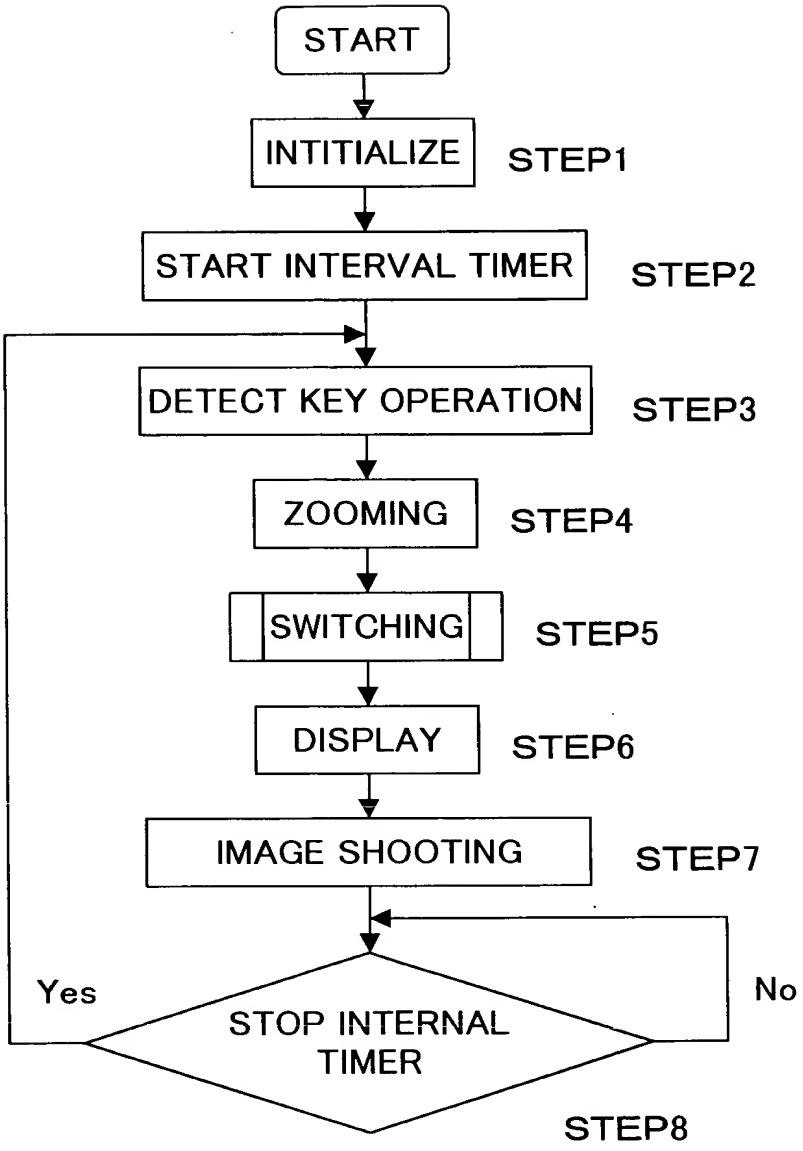

START
INTITIALIZE
STEP1
START INTERVAL TIMER
STEP2
DETECT KEY OPERATION
STEP3
ZOOMING
STEP4
SWITCHING
STEP5
DISPLAY
STEP6
IMAGE SHOOTING
STEP7
Yes
No
STOP INTERNAL TIMER
STEP8

FIG.19

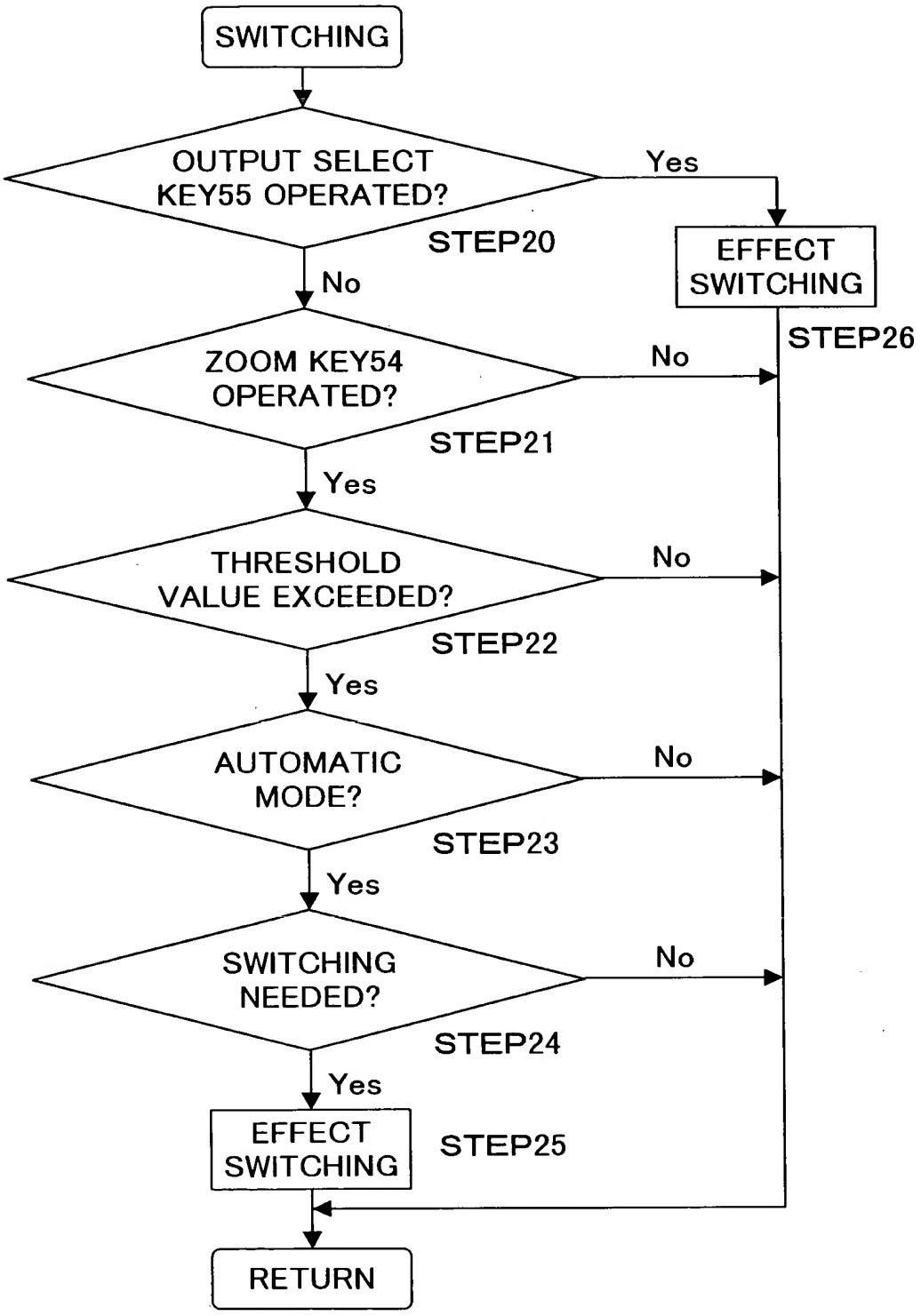

SWITCHING
OUTPUT SELECT KEY55 OPERATED?
Yes
STEP20
No
EFFECT SWITCHING
STEP26
ZOOM KEY54 OPERATED?
No
STEP21
Yes
THRESHOLD VALUE EXCEEDED?
No
STEP22
Yes
AUTOMATIC MODE?
No
STEP23
Yes
SWITCHING NEEDED?
No
STEP24
Yes
EFFECT SWITCHING
STEP25
RETURN

FIG.20

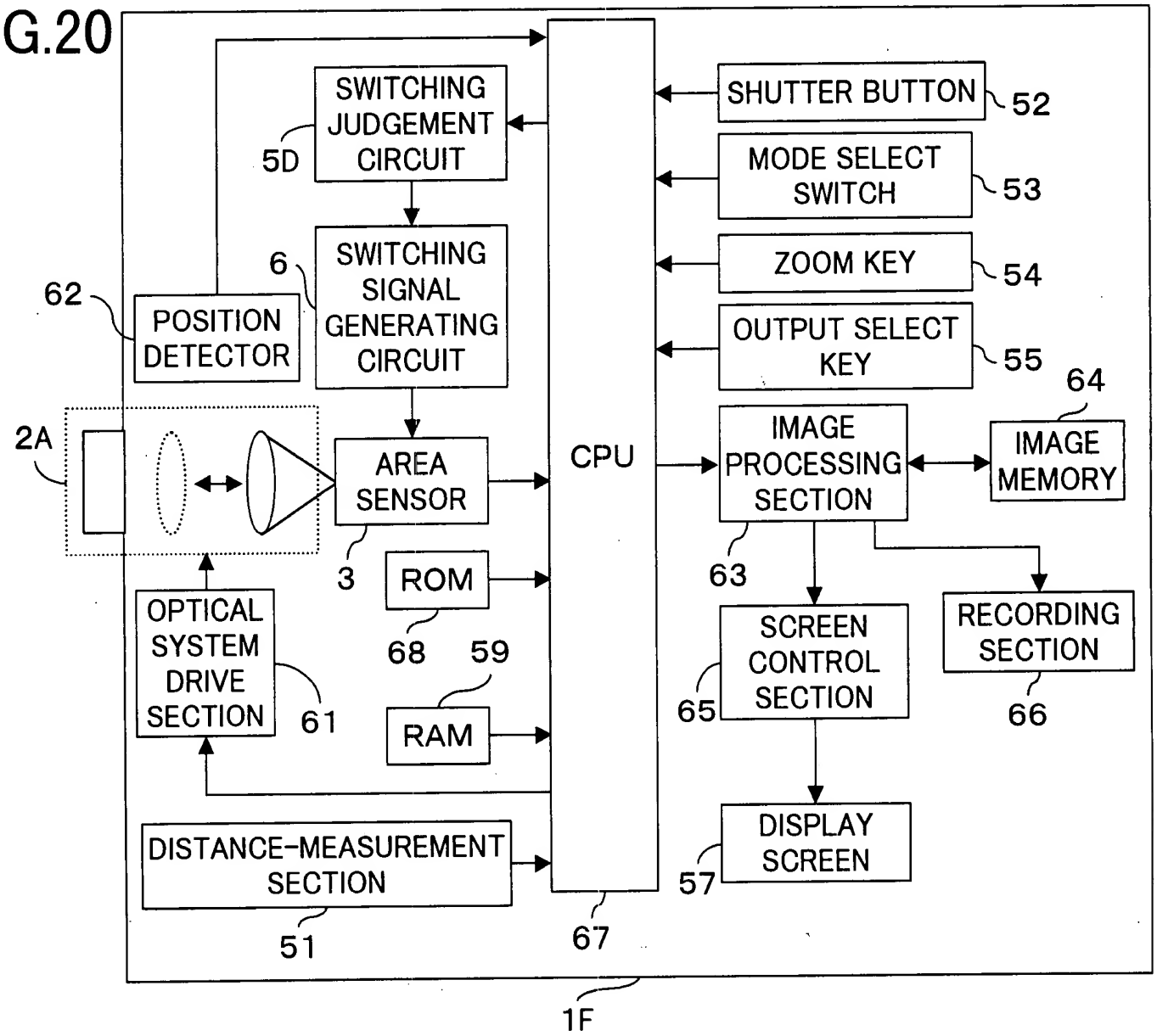

SWITCHING JUDGEMENT CIRCUIT
5D
SHUTTER BUTTON
52
MODE SELECT SWITCH
53
ZOOM KEY
54
OUTPUT SELECT KEY
55
SWITCHING SIGNAL GENERATING CIRCUIT
6
62
POSITION DETECTOR
2A
AREA SENSOR
3
CPU
IMAGE PROCESSING SECTION
64
IMAGE MEMORY
63
ROM
68
OPTICAL SYSTEM DRIVE SECTION
61
59
RAM
SCREEN CONTROL SECTION
65
RECORDING SECTION
66
DISPLAY SCREEN
57
DISTANCE-MEASUREMENT SECTION
51
67
1F

FIG.21A

DISTANCE ··· REMOTE

MAGNIFY ··· HIGH

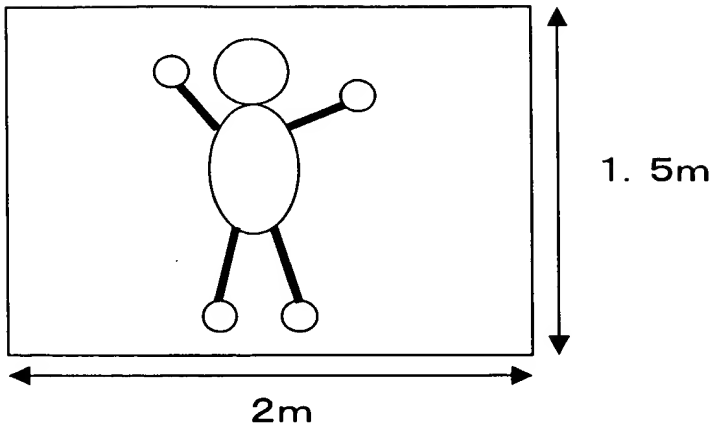


FIG.21B

DISTANCE ··· CLOSE

MAGNIFY ··· LOW

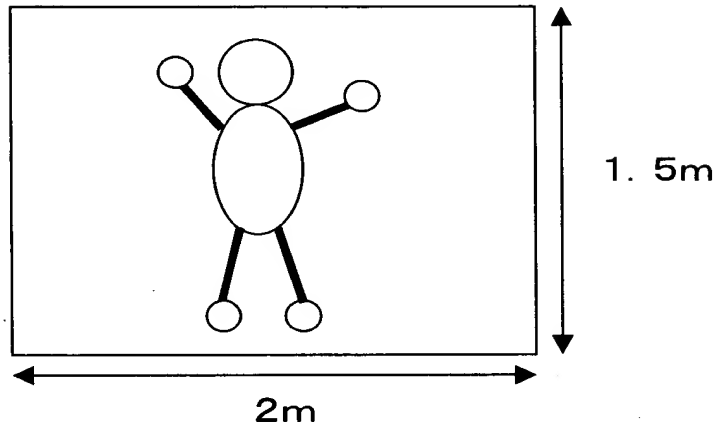


FIG.21C

DISTANCE ··· REMOTE

MAGNIFY ··· LOW

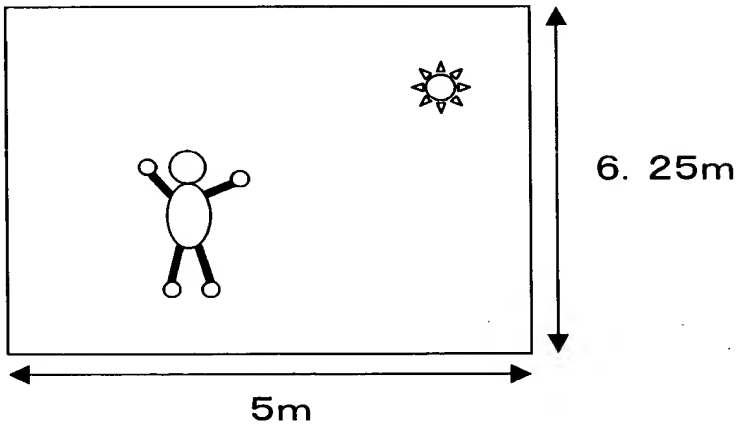


FIG.22

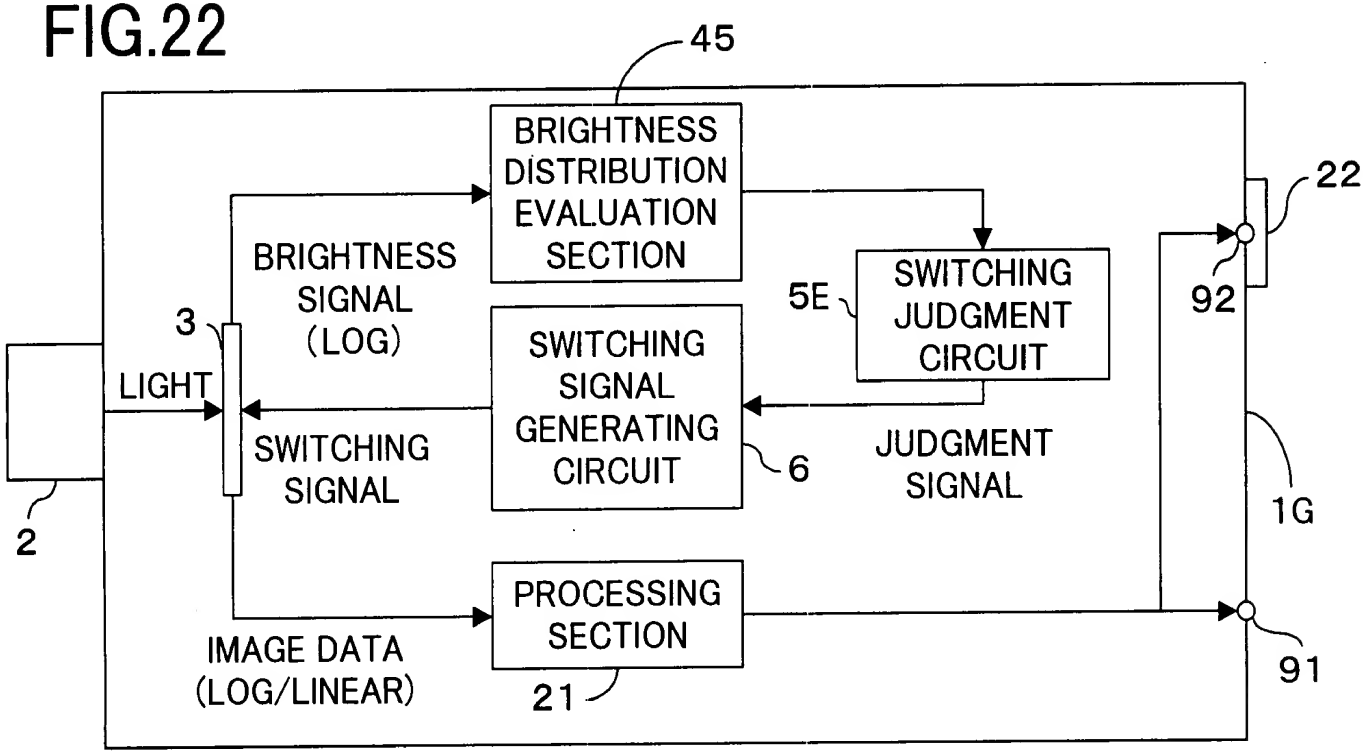

45
BRIGHTNESS DISTRIBUTION EVALUATION SECTION
22
BRIGHTNESS SIGNAL (LOG)
3
5E
SWITCHING JUDGMENT CIRCUIT
92
LIGHT
SWITCHING SIGNAL GENERATING CIRCUIT
6
SWITCHING SIGNAL
JUDGMENT SIGNAL
2
1G
PROCESSING SECTION
91
IMAGE DATA (LOG/LINEAR)
21

FIG.23

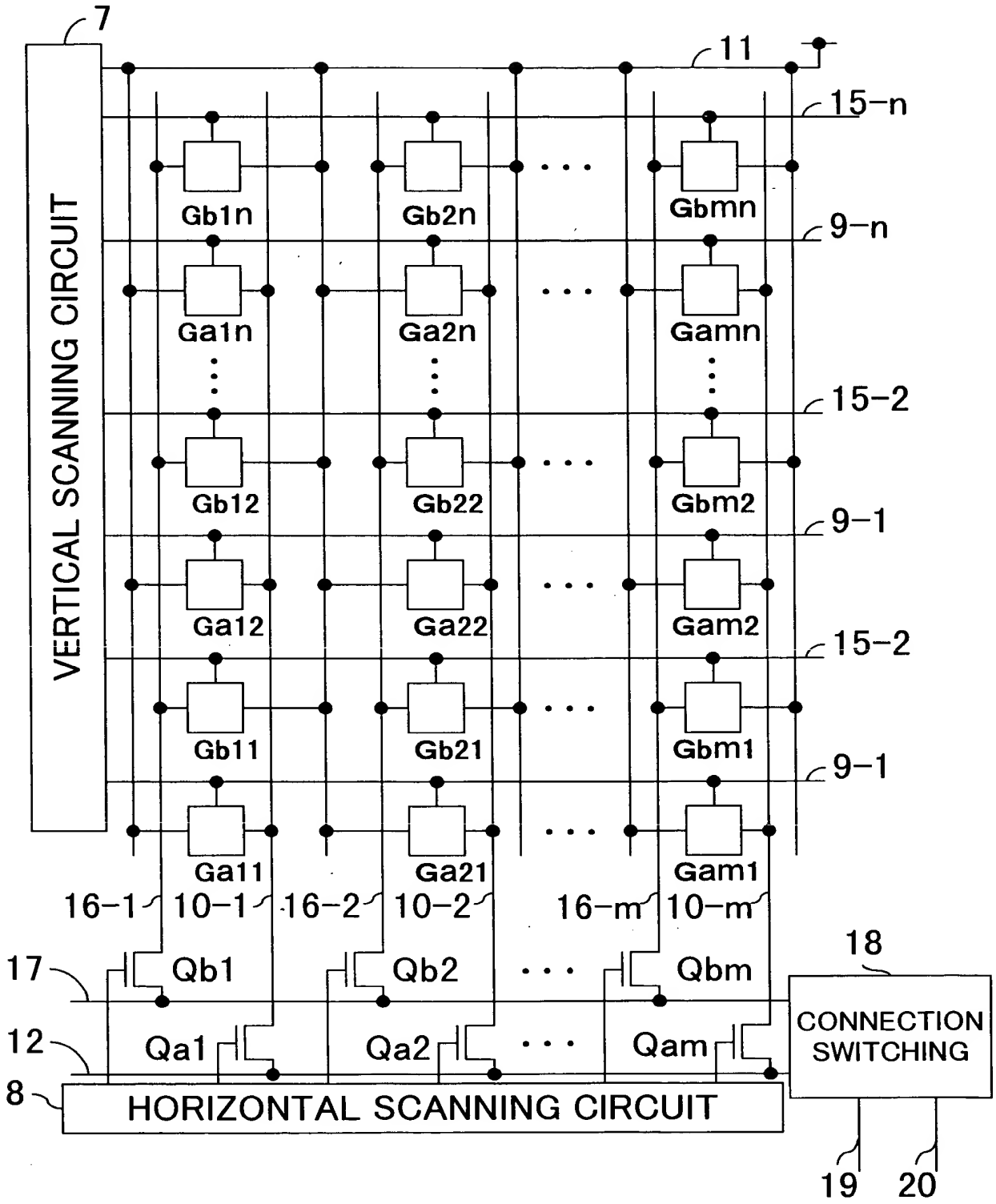

7
VERTICAL SCANNING CIRCUIT
11
15-n
9-n
15-2
9-1
15-2
9-1
Gb1n
Gb2n
Gbmn
Ga1n
Ga2n
Gamn
Gb12
Gb22
Gbm2
Ga12
Ga22
Gam2
Gb11
Gb21
Gbm1
Ga11
Ga21
Gam1
16-1
10-1
16-2
10-2
16-m
10-m
17
Qb1
Qb2
Qbm
18
CONNECTION SWITCHING
12
Qa1
Qa2
Qam
8
HORIZONTAL SCANNING CIRCUIT
19
20

FIG.24

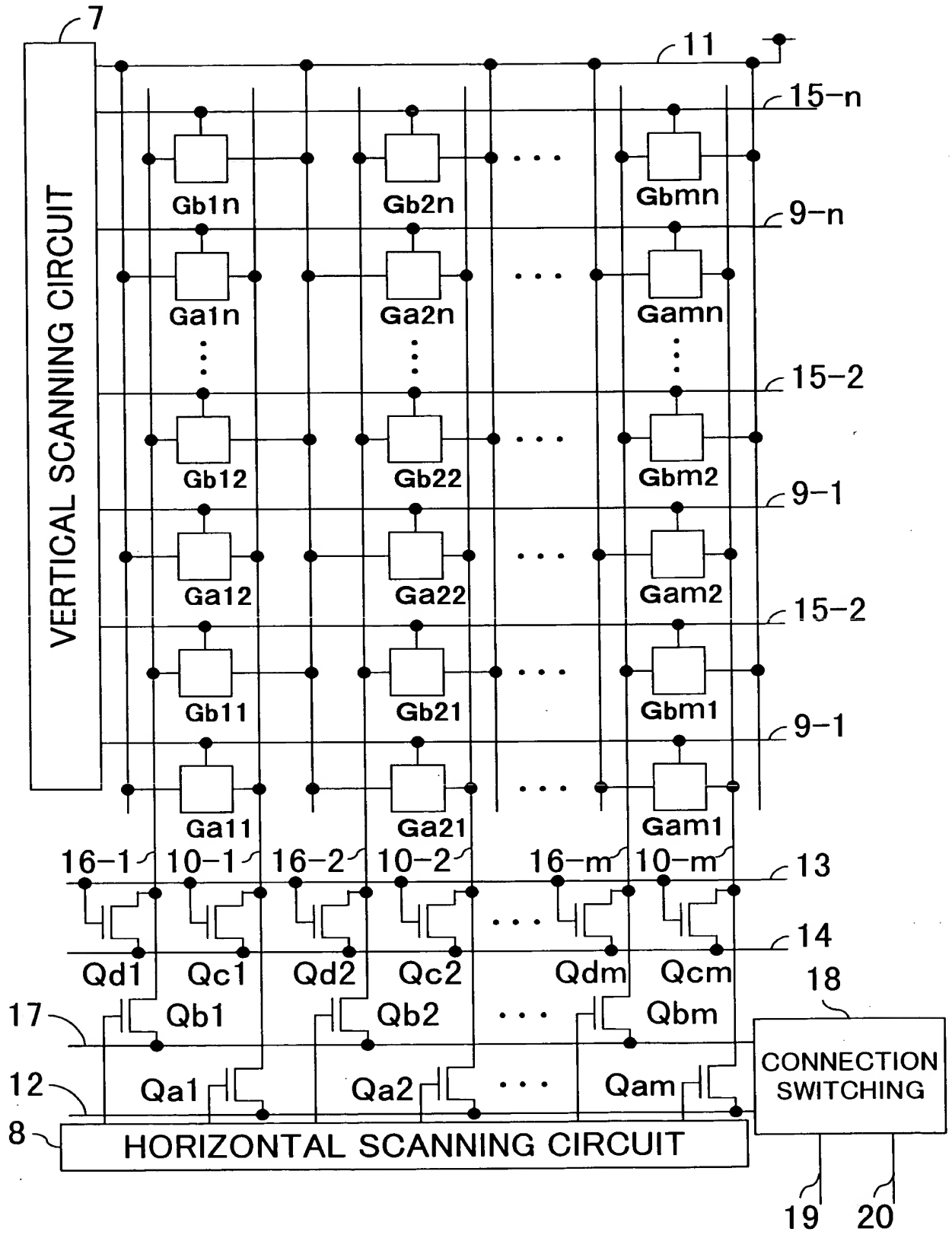

7
11
15-n
9-n
15-2
9-1
15-2
9-1
13
14
18
17
12
8
19
20
VERTICAL SCANNING CIRCUIT
Gb1n
Gb2n
Gbmn
Ga1n
Ga2n
Gamn
Gb12
Gb22
Gbm2
Ga12
Ga22
Gam2
Gb11
Gb21
Gbm1
Ga11
Ga21
Gam1
16-1
10-1
16-2
10-2
16-m
10-m
Qd1
Qc1
Qd2
Qc2
Qdm
Qcm
Qb1
Qb2
Qbm
Qa1
Qa2
Qam
CONNECTION SWITCHING
HORIZONTAL SCANNING CIRCUIT

FIG.25

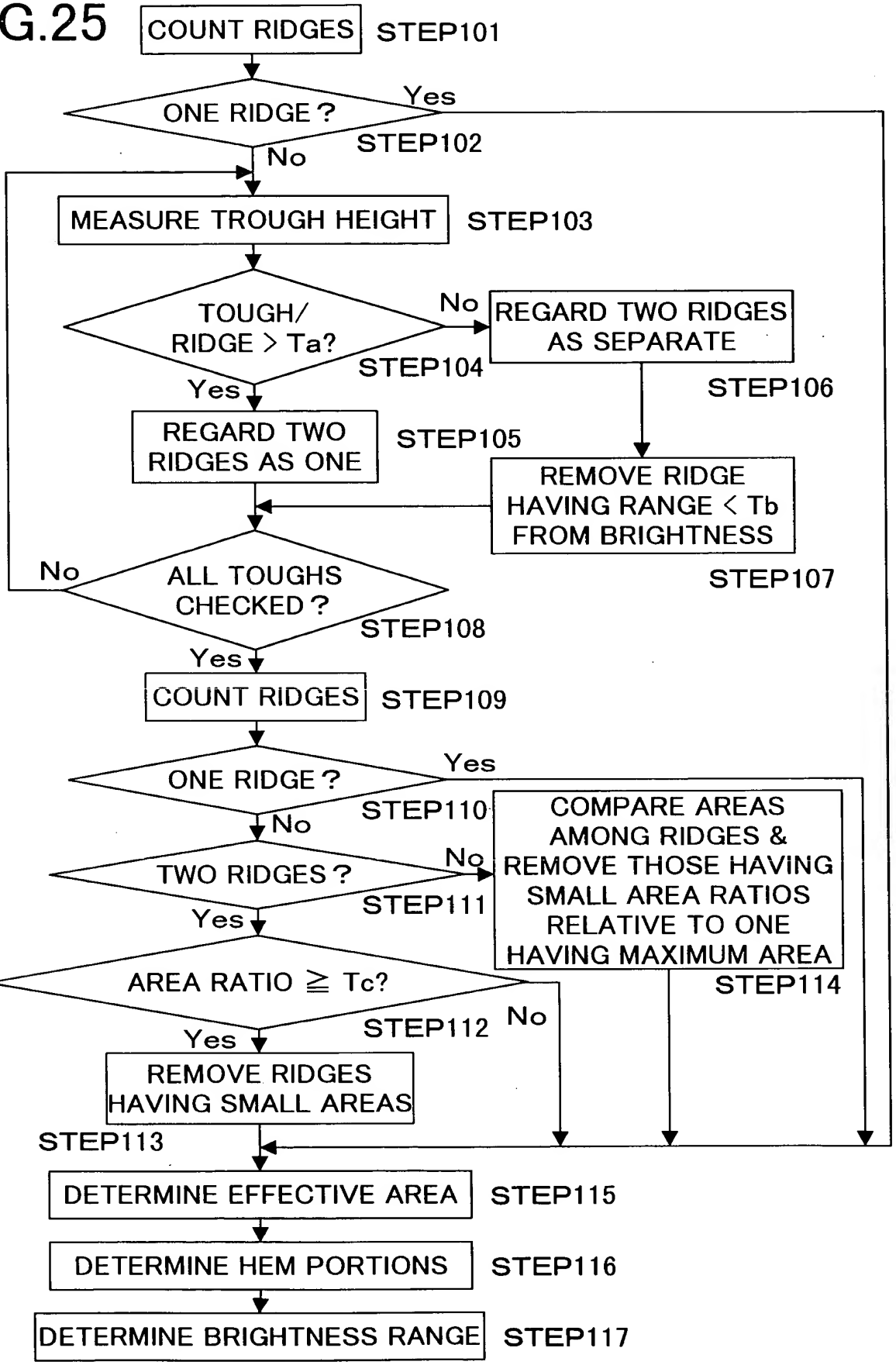

COUNT RIDGES
STEP101
ONE RIDGE ?
Yes
STEP102
No
MEASURE TROUGH HEIGHT
STEP103
TOUGH/
RIDGE > Ta?
No
STEP104
REGARD TWO RIDGES
AS SEPARATE
STEP106
Yes
REGARD TWO
RIDGES AS ONE
STEP105
REMOVE RIDGE
HAVING RANGE < Tb
FROM BRIGHTNESS
STEP107
No
ALL TOUGHS
CHECKED ?
STEP108
Yes
COUNT RIDGES
STEP109
ONE RIDGE ?
Yes
STEP110
No
TWO RIDGES ?
No
STEP111
COMPARE AREAS
AMONG RIDGES &
REMOVE THOSE HAVING
SMALL AREA RATIOS
RELATIVE TO ONE
HAVING MAXIMUM AREA
STEP114
Yes
AREA RATIO ≧ Tc?
STEP112
No
Yes
REMOVE RIDGES
HAVING SMALL AREAS
STEP113
DETERMINE EFFECTIVE AREA
STEP115
DETERMINE HEM PORTIONS
STEP116
DETERMINE BRIGHTNESS RANGE
STEP117

FIG.26

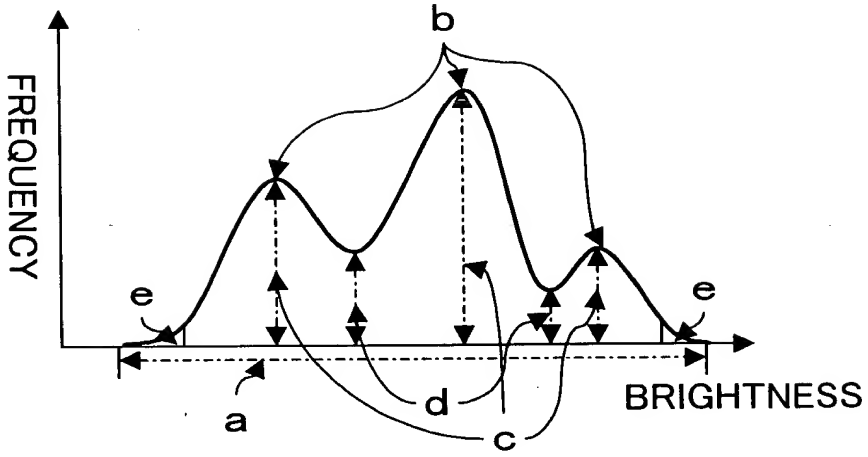


FIG.27A

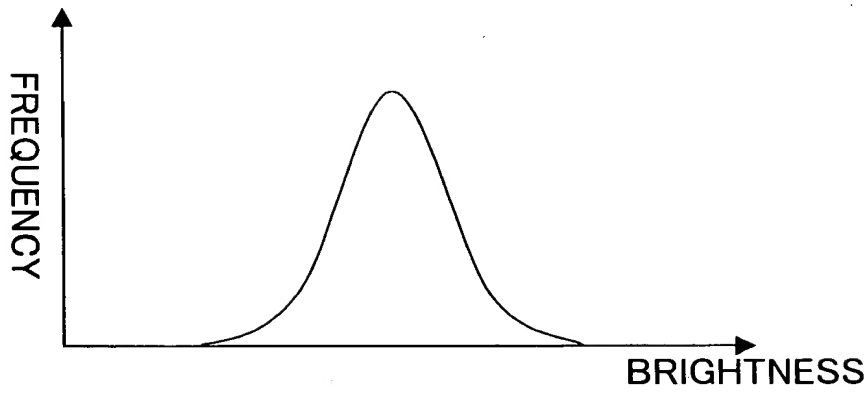


FIG.27B

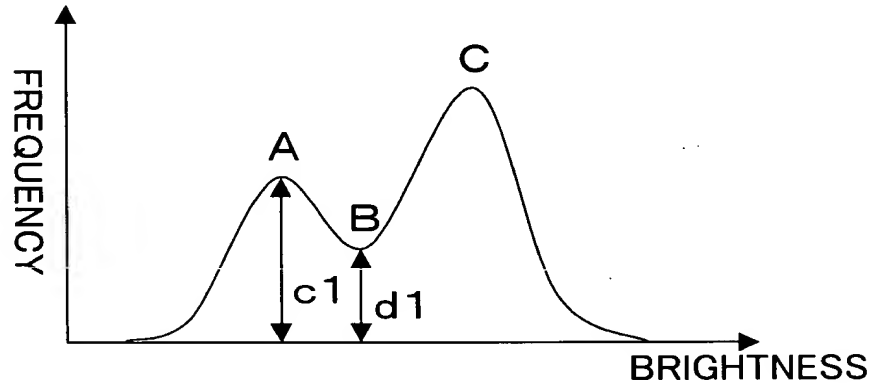


FIG.27C

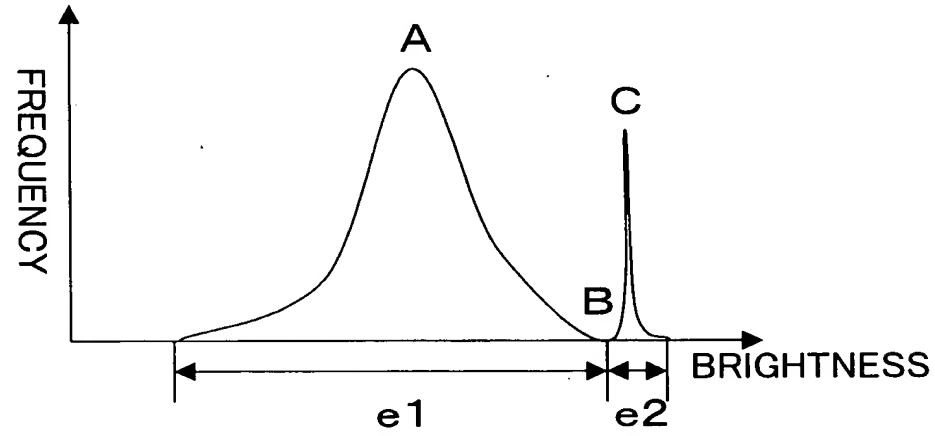


FIG.28

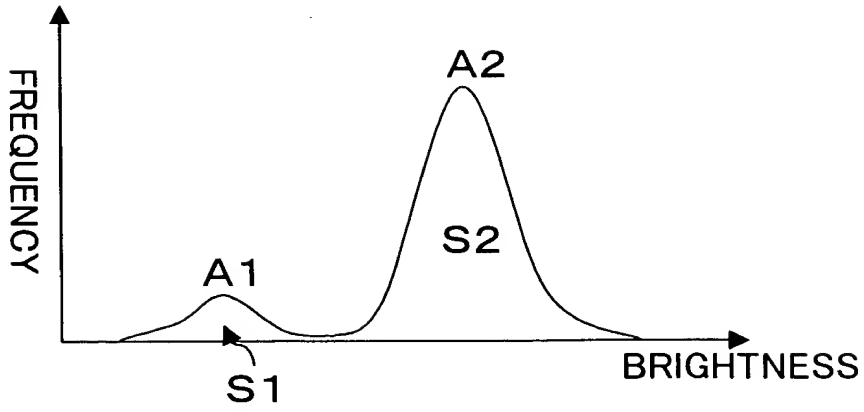

FREQUENCY
A2
S2
A1
S1
BRIGHTNESS

FIG.29

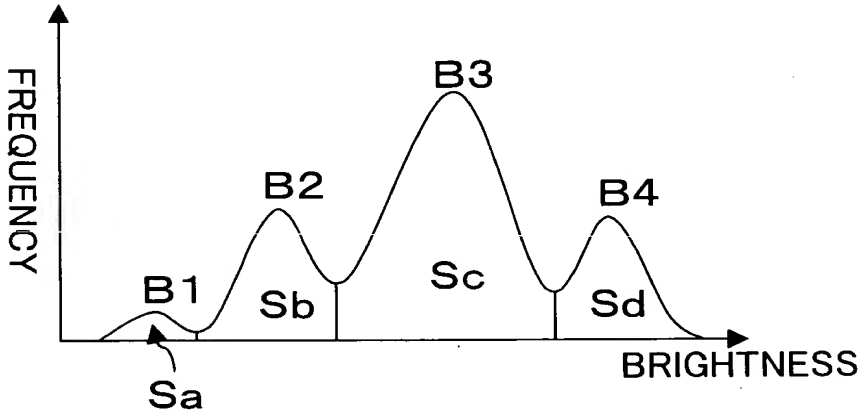

FREQUENCY
B3
B2
B4
B1
Sb
Sc
Sd
Sa
BRIGHTNESS

FIG.30

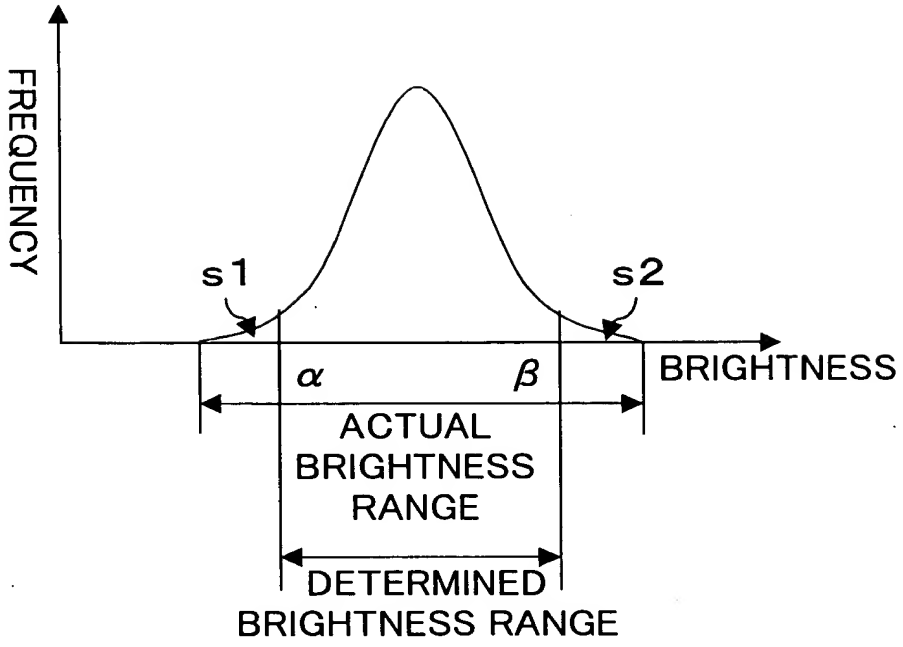

FREQUENCY
s1
s2
α
β
BRIGHTNESS
ACTUAL
BRIGHTNESS
RANGE
DETERMINED
BRIGHTNESS RANGE

FIG.31

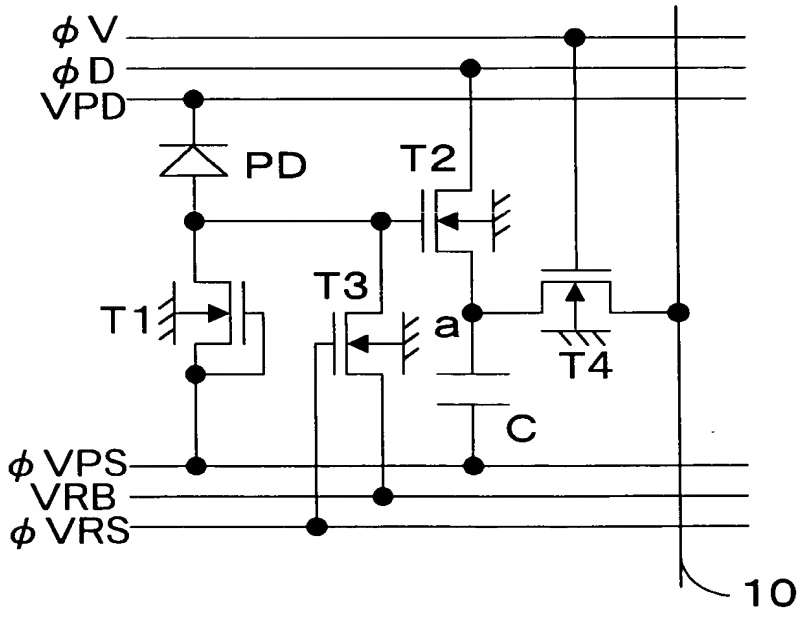

φV
φD
VPD
PD
T2
T1
T3
a
T4
C
φVPS
VRB
φVRS
10

FIG.32

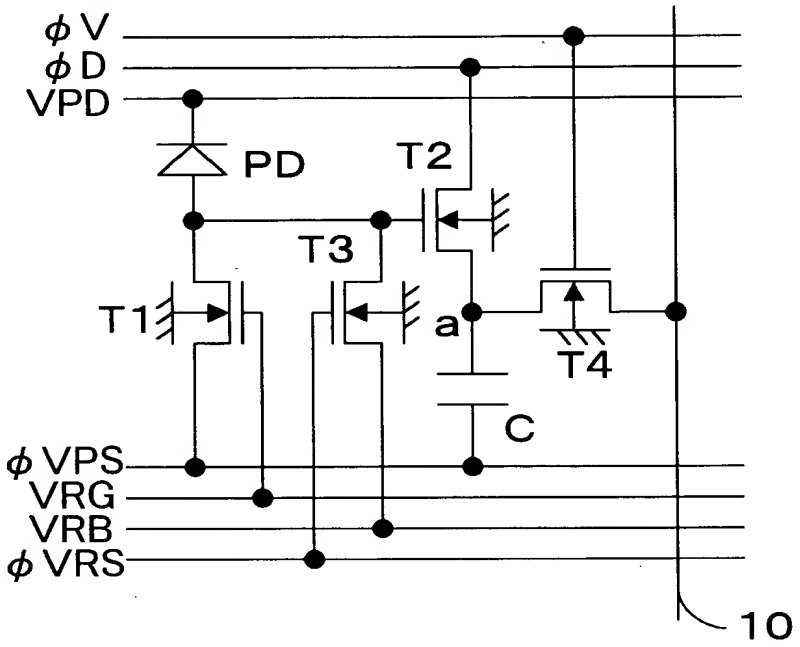

φV
φD
VPD
PD
T2
T3
T1
a
T4
C
φVPS
VRG
VRB
φVRS
10

FIG.33

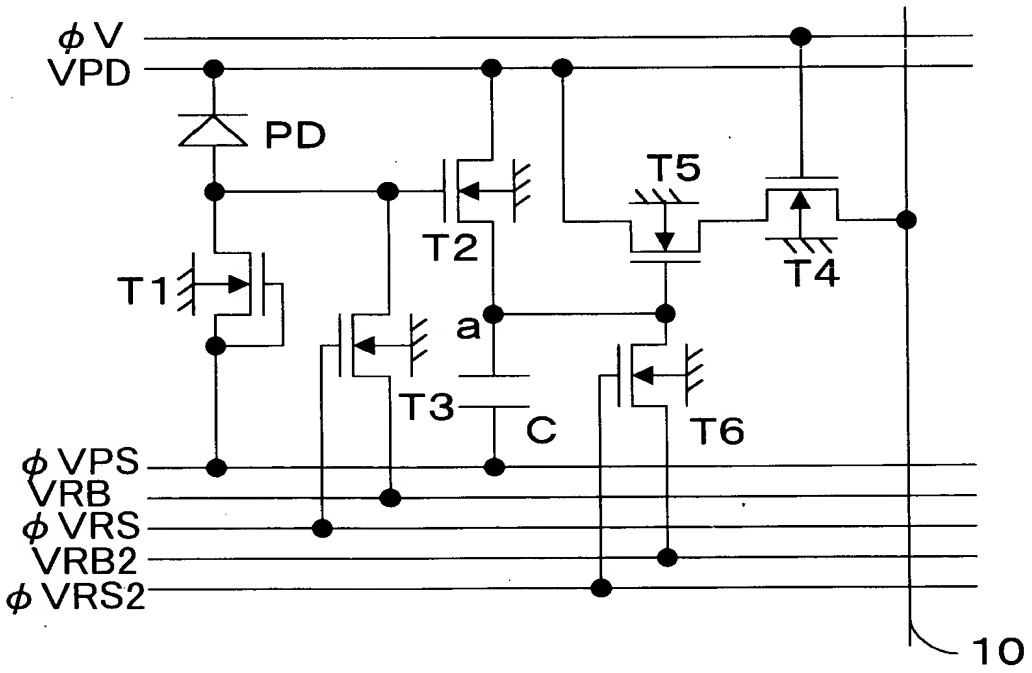

φV
VPD
PD
T5
T2
T4
T1
a
T3
C
T6
φVPS
VRB
φVRS
VRB2
φVRS2
10

FIG.34

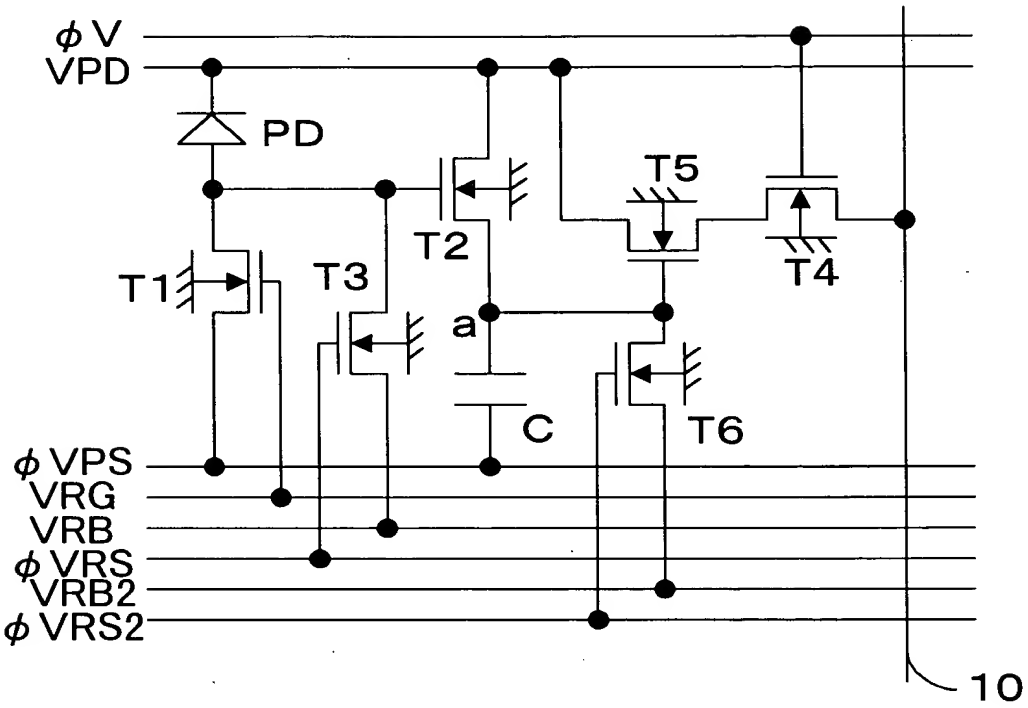

φV
VPD
PD
T1
T2
T3
T4
T5
T6
a
C
φVPS
VRG
VRB
φVRS
VRB2
φVRS2
10

FIG.35

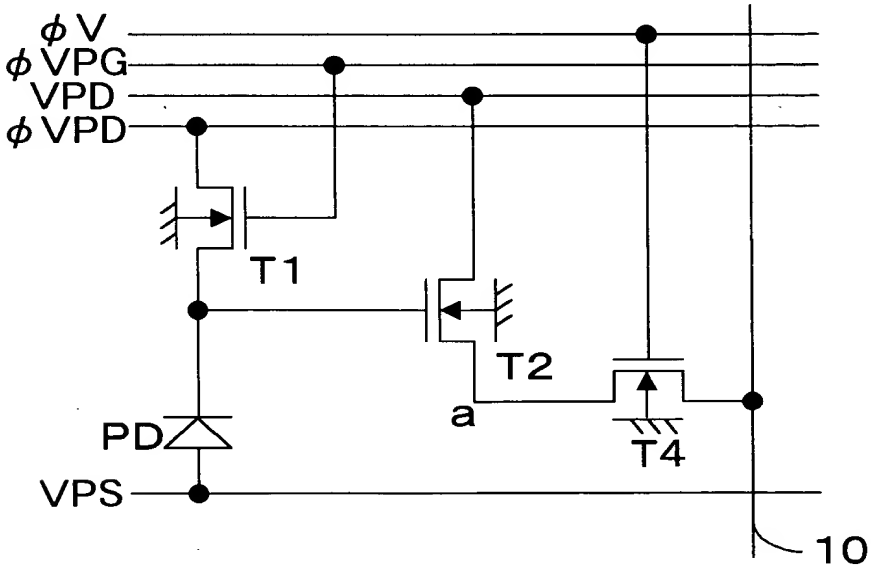
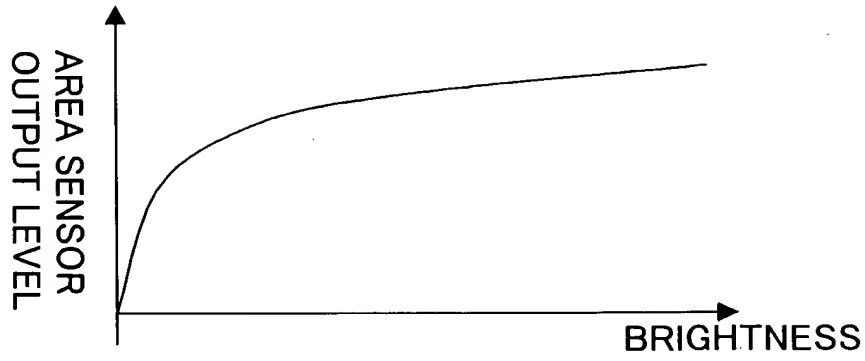

φV
φVPG
VPD
φVPD
T1
T2
a
T4
PD
VPS
10

FIG.36

PRIOR ART